

## Algebra 2 CP Midterm Review

Name all the subsets of the real numbers to which each number belongs:

1)  $4.34343434 \dots$

Rational  
Real

2)  $\sqrt{5}$

Irrational  
Real

3)  $-18$

Integer  
Rational  
Real

Name the property illustrated by each of the following:

4)  $5 \cdot \frac{1}{5} = 1$

Inverse prop  
of multiplication

5)  $a + 4 = 4 + a$

Commutative prop  
of addition

6.) Evaluate for  $x = 1$ :  $\frac{[2(x+9) - 4(5x-2)]}{x-2} = \frac{[2(1+9) - 4(5(1)-2)]}{1-2} =$

$$\frac{2(10) - 4(3)}{-1} = \frac{20 - 12}{-1} = \frac{8}{-1} = \boxed{-8}$$

Simplify:

7)  $15 \div 3 + 2 \cdot 20 - 4^2$

$$\begin{aligned} &5 + 40 - 16 \\ &45 - 16 \\ &\boxed{29} \end{aligned}$$

8.)  $\left(\frac{2a}{3}\right)^2 = \frac{(2a)^2}{3^2}$

$$\boxed{\frac{4a^2}{9}}$$

9.)  $(-5a^3b)^2(-a^4b)$

$$\begin{aligned} &(25a^6b^2)(-a^4b) \\ &\boxed{-25a^{10}b^3} \end{aligned}$$

10.)  $(6a^{-4}b^4)^2$

$$36a^{-8}b^8$$

$$\boxed{\frac{36b^8}{a^8}}$$

11.)  $(-2a^5b^4)^4$

$$\boxed{16a^{20}b^{16}}$$

12.)  $\frac{12a^3b^8}{4a^6b^2} = \frac{3b^6}{a^3}$

$$\boxed{\frac{3b^6}{a^3}}$$

Solve for the value of  $h$ :

$$13.) 5h + 12 - 2h = 30 - 12$$

$$\frac{3h}{3} = \frac{18}{3} \quad \boxed{h=6}$$

$$14.) 3h - 2(2 - 4h) = 7$$

$$3h - 4 + 8h = 7$$

$$11h = 11 \quad \boxed{h=1}$$

$$15.) 3h + 2 = -h - 6$$

$$+h \quad -2 \quad +h \quad -6$$

$$4h = -8$$

$$\boxed{h=-2}$$

$$16.) -3h + 18 < 12$$

$$\frac{-3h}{-3} < \frac{-6}{-3} \quad \boxed{h > 2}$$

\* divide or multiply by a (-) switches the inequality.

$$17.) h + 3 < 7 \text{ or } -2h < -12$$

$$h < 4 \text{ or } h > 6$$

$$18.) 4 < 3h - 5 < 10$$

$$\frac{+5}{+5} \quad \frac{+5}{+5} \quad \frac{+5}{+5}$$

$$\frac{9 < 3h < 15}{\frac{3}{3} \quad \frac{3}{3} \quad \frac{3}{3}} \quad \boxed{3 < h < 5}$$

Isolate the Absolute Value first!

$$19.) -4|h-8| < -20$$

$$\frac{-4}{-4} \quad \frac{-20}{-4}$$

$$|h-8| > 5$$

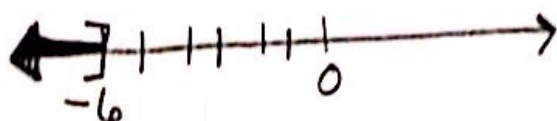
then

$$h-8 > 5 \text{ or } h-8 < -5$$

$$\boxed{h > 13 \text{ or } h < 3}$$

$$20.) \text{ Graph the solution: } x + 5 \leq -1$$

$$\frac{-5 \quad -5}{x \leq -6}$$



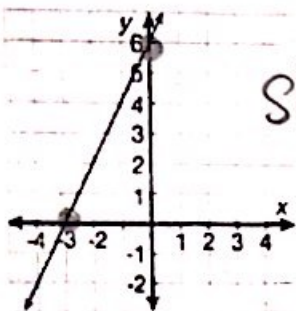
Remember:

] or [ if  $\leq$  or  $\geq$

) or ( if  $<$  or  $>$



21.) What is the slope of the line graphed below?



$$\text{Slope} = \frac{\text{rise}}{\text{run}} = \frac{6}{3} = \boxed{2}$$

true if 'y' values are the same!

22.) Describe the slope of a line passing through the two points (3, 1) and (3, 6).

A) horizontal

**B) vertical**

C) rises to the right

D) falls to the right

true if  $m > 0$

true if  $m < 0$

vertical line

x's are the same!

23.) Given a slope of -3 and a y-intercept of 5, write the equation of the line in slope intercept form.

$$y = mx + b$$

$$\boxed{y = -3x + 5}$$

$m = \text{slope}$

$b = y\text{-int}$

24.) Find the slope-intercept form of the line passing through the point (4, 6) and parallel to the line  $y = -4x - 5$ .

$$m = -4$$

Parallel  $m = -4$

$$y - y_1 = m(x - x_1) \Rightarrow \text{pt slope form}$$

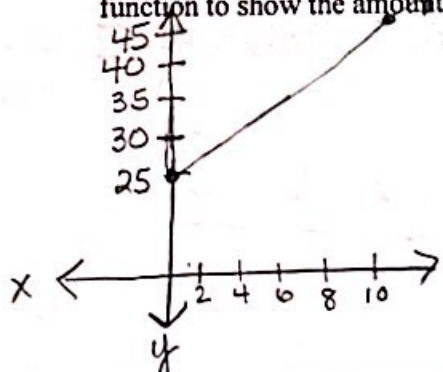
$$y - 6 = -4(x - 4)$$

$$y - 6 = -4x + 16$$

$$\boxed{y = -4x + 22}$$

parallel = slopes!

25.) An oil tank that is being filled starts out with 25 gallons of oil. The amount is increasing by 2 gallons per minute. Write a function that describes the amount in the tank over time. Graph the function to show the amount over the first 10 minutes.



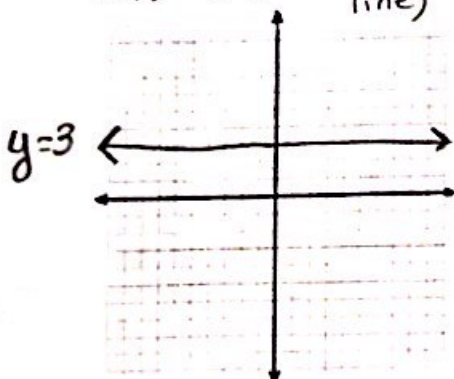
$x = \# \text{ of minutes}$

$$f(x) = 25 + 2x$$

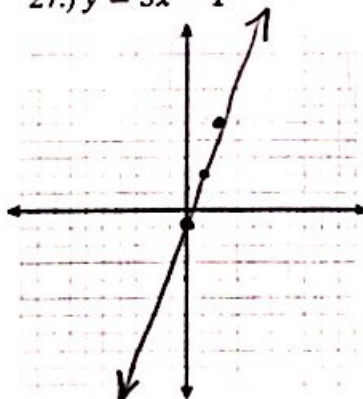
$$\text{or } f(x) = 2x + 25$$

Graph each equation/inequality.

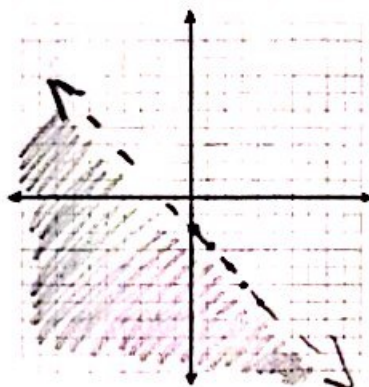
26.)  $y = 3$  (horizontal line)



27.)  $y = 3x - 1 \Rightarrow y\text{-intercept}$



Test (0, 0)  
 $0 < -2$  F  
 $28.) y < -x - 2 \Rightarrow y\text{-int}$



Perform the indicated operations:

29.)  $(4a^2 - a + 5) - (6a^2 + a - 3)$

$$\begin{array}{r} 4a^2 - a + 5 \\ - 6a^2 - a + 3 \\ \hline -2a^2 - 2a + 8 \end{array}$$

31.)  $6a^2b - 3ab - (4a^2b - 5ab)$

$$\begin{array}{r} 6a^2b - 3ab \\ - 4a^2b + 5ab \\ \hline 2a^2b + 2ab \end{array}$$

33.) FOIL  $(5a+2)(a-4)$

$$\begin{array}{r} 5a^2 - 20a + 2a - 8 \\ \hline 5a^2 - 18a - 8 \end{array}$$

35.)  $(3x^3 - 8x^2 - 15x - 4) \div (x - 4)$

$$\begin{array}{r|rrrr} 4 & 3 & -8 & -15 & -4 \\ & \downarrow & 12 & 16 & 4 \\ \hline & 3 & 4 & 1 & 0 \text{ Remainder} \end{array}$$

$$\boxed{3x^2 + 4x + 1}$$

37.)  $\frac{x^3-1}{x-1} \Rightarrow \begin{array}{l} \text{for } x^2 \text{ term} \\ \text{for } x \text{ term} \end{array}$

$$\begin{array}{r|rrrr} 1 & 1 & 0 & 0 & -1 \\ & \downarrow & 1 & 1 & 1 \\ \hline & 1 & 1 & 1 & 0 \end{array}$$

$$\boxed{x^2 + x + 1}$$

30.)  $(5a^2b - 3ab + 9) + (3ab - 2a^2b - 6)$

$$\boxed{3a^2b + 3}$$

32.)  $8a^2(2a^2 - 5a + 9)$

$$\boxed{16a^4 - 40a^3 + 72a^2}$$

34.)  $(a-2)(a^2 - 5a - 7)$

$$\begin{array}{r} a^3 - 5a^2 - 7a - 2a^2 + 10a + 14 \\ \hline a^3 - 7a^2 + 3a + 14 \end{array}$$

36.)  $(x^3 - 3x^2 - 16x + 6) \div (x + 3)$

$$\begin{array}{r|rrrr} -3 & 1 & -3 & -16 & 6 \\ & \downarrow & -3 & 18 & -6 \\ \hline & 1 & -6 & 2 & 0 \text{ R} \end{array}$$

$$\boxed{x^2 - 6x + 2}$$

38.)  $9x^3 - 19x - 10 \div 3x + 2$

$$\begin{array}{r} \boxed{3x^2 - 2x - 5} \\ 3x+2 \overline{) 9x^3 + 0x^2 - 19x - 10} \\ \underline{-(9x^3 + 6x^2)} \phantom{-10} \\ -6x^2 - 19x \phantom{-10} \\ \underline{-(-6x^2 - 4x)} \phantom{-10} \\ -15x - 10 \\ \underline{-(-15x - 10)} \\ 0 \text{ Remainder} \end{array}$$



Simplify:

39.)  $\sqrt{98}$

$$\begin{array}{l} 49 \cdot 2 \\ \sqrt{49} \cdot \sqrt{2} \\ \boxed{7\sqrt{2}} \end{array}$$

41.)  $\sqrt{49a^4b^{16}}$

$$\boxed{7a^2b^8}$$

43.)  $4\sqrt{32} + 2\sqrt{50}$

$$\begin{array}{l} 16 \cdot 2 \quad 25 \cdot 2 \\ 4 \cdot 4\sqrt{2} + 2 \cdot 5\sqrt{2} \\ 16\sqrt{2} + 10\sqrt{2} = \boxed{26\sqrt{2}} \end{array}$$

45.)  $4\sqrt{3x} \cdot 5\sqrt{6x^5}$

$$\begin{array}{l} 20\sqrt{18x^6} \\ 9 \cdot 2 \\ 20 \cdot 3x^3\sqrt{2} = \boxed{60x^3\sqrt{2}} \end{array}$$

FOIL  
47.)  $(3+7\sqrt{2})(3-7\sqrt{2})$

$$\begin{array}{l} 9 - 21\sqrt{2} + 21\sqrt{2} - 49\sqrt{4} \\ 9 - 49(2) = 9 - 98 = \boxed{-89} \end{array}$$

49.)  $\frac{\sqrt{27}}{\sqrt{3}} = \sqrt{\frac{27}{3}} = \sqrt{9} = \boxed{3}$

40.)  $\sqrt{25a^4b^8c^{10}}$

$$\boxed{5a^2b^4c^5}$$

42.)  $\sqrt{12a^3b^6}$

$$\begin{array}{l} 4 \cdot 3 \\ \boxed{2ab^3\sqrt{3a}} \end{array}$$

44.)  $5\sqrt{27} - 4\sqrt{12} = 5 \cdot 3\sqrt{3} - 4 \cdot 2\sqrt{3}$   
 $15\sqrt{3} - 8\sqrt{3}$   
 $\boxed{7\sqrt{3}}$

46.)  $\sqrt{2}(\sqrt{5}-4\sqrt{3})$

$$\boxed{\sqrt{10} - 4\sqrt{6}}$$

FOIL  
48.)  $(4+\sqrt{5})(2-3\sqrt{5})$

$$\begin{array}{l} 8 - 12\sqrt{5} + 2\sqrt{5} - 3\sqrt{25} \\ 8 - 10\sqrt{5} - 15 \\ \boxed{-7 - 10\sqrt{5}} \end{array}$$